CLAIMS

What is claimed is:

1. A medical device, comprising:

an encasement;

an electrical device disposed within said encasement;

an electrical contact coupled to said electrical device;

a feedthrough assembly, comprising:

i) a ferrule extending through said encasement and having an inner surface and an outer surface,

ii) a terminal extending through said ferrule and having a first end extending into said encasement,

iii) a conductive metal coating covering said first end, said coating being more resistant to oxidation than said terminal, and

iv) a body of insulation material disposed between said terminal and said inner wall for preventing said ferrule from electrically contacting said terminal; and

a connector for electrically coupling and mechanically engaging said first end with said electrical contact.

2. A medical device according to claim 1, wherein said conductive metal coating also covers an area of said terminal adjacent to said body of insulation material.

3. A medical device according to claim 1, wherein said connector is a crimping device.

4. A medical device according to claim 1, wherein said connector is a spring device.

5. A medical device according to claim 1, wherein said conductive metal coating entirely covers said terminal.

6. A medical device according to claim 1, wherein said conductive metal coating is a noble metal or a noble metal alloy.

7. A medical device according to claim 1, wherein said conductive metal coating is rhodium.

8. A medical device according to claim 1, wherein said conductive metal coating is ruthenium.

9. A medical device according to claim 1, wherein said conductive metal coating is palladium.

10. A medical device according to claim 1, wherein said conductive metal coating is gold.

11. A medical device according to claim 1, wherein said conductive metal coating is platinum.

12. A medical device according to claim 1, wherein said conductive metal coating covers said terminal at a minimum thickness of about 100Å.

13. A medical device according to claim 12, wherein said conductive metal coating covers said terminal at a thickness ranging between about 3000 Å and about 7,000 Å.

14. A medical device according to claim 1, wherein said terminal is a refractory metal or a refractory metal alloy.

15. A medical device according to claim 1, further comprising:

a second electrical contact;

a second conductive metal coating covering at least a portion of said ferrule outer surface; and

a second connector for electrically coupling and mechanically engaging said ferrule outer surface with said second electrical contact.

16. A medical device according to claim 15, wherein said second connector is a spring device.

17. A medical device according to claim 15, wherein said second conductive metal coating is a noble metal or a noble metal alloy.

18. A medical device according to claim 15, wherein said second conductive metal coating comprises titanium.

19. A medical device according to claim 15, wherein said second conductive metal coating comprises niobium.

20. A medical device according to claim 15, wherein said second conductive metal coating covers said ferrule at a minimum thickness of about 100Å.

21. A medical device according to claim 20, wherein said second conductive metal coating covers said ferrule at a thickness ranging between about 3000 Å and about 7,000 Å.

22. A method of manufacturing a medical device, comprising the steps of:

deploying an electrical device within an encasement, said electrical device being coupled to an electrical contact;

forming a feedthrough assembly in said encasement, said feedthrough assembly comprising:

i) a ferrule extending through said encasement and having an outer surface,

ii) a terminal extending through said ferrule, and comprising a first end,

iii) a conductive metal coating that is more resistant to oxidation than said terminal and covers said first end of said terminal, and

iv) a body of insulation material preventing said ferrule from electrically contacting said terminal; and

electrically coupling and mechanically engaging said first end of said terminal with said electrical contact using a connector.

23. A method according to claim 22, wherein said connector is a crimping device.

24. A method according to claim 22, wherein said connector is a spring device.

25. A method according to claim 22, wherein said conductive metal coating is a noble metal or a noble metal alloy.

26. A method according to claim 22, wherein said conductive metal coating is rhodium.

27. A method according to claim 22, wherein said conductive metal coating is ruthenium.

28. A method according to claim 22, wherein said conductive metal coating is palladium.

29. A method according to claim 22, wherein said conductive metal coating is gold.

30. A method according to claim 22, wherein said conductive metal coating is platinum.

31. A method according to claim 22, wherein conductive metal coating covers said terminal at a minimum thickness of about 100Å.

32. A method according to claim 31, wherein said conductive metal coating covers said terminal at a thickness ranging between about 3000 Å and about 7,000 Å.

33. A method according to claim 22, wherein said step of forming a feedthrough assembly in said encasement comprises:

mechanically or chemically masking an area of said terminal that is to be surrounded by said insulating material; and

coating unmasked areas of said terminal, including said first end, with said conductive metal.

34. A method according to claim 22, wherein said step of forming a feedthrough assembly in said encasement comprises:

inserting said first end of said terminal through said ferrule;

mechanically or chemically masking said insulating material adjacent to said first end of said terminal; and

coating at least said first end of said terminal with said conductive metal.

35. A method according to claim 22, wherein step of forming a feedthrough assembly in said encasement comprises:

entirely coating said terminal with said conductive metal coating.

36. A method according to claim 22, wherein said terminal is a refractory metal or a refractory metal alloy.

37. A method according to claim 22, wherein said feedthrough assembly further comprises a second conductive metal coating covering at least a portion of said ferrule outer surface, said method further comprising:

electrically coupling and mechanically engaging said ferrule outer surface with a second electrical contact using a second connector.

38. A method according to claim 37, wherein said second connector is a spring device.

39. A method according to claim 37, wherein said second conductive metal coating is a noble metal or a noble metal alloy.

40. A method according to claim 37, wherein said second conductive metal coating comprises titanium.

41. A method according to claim 37, wherein said second conductive metal coating comprises niobium.

42. A method according to claim 37, wherein said second conductive metal coating covers said ferrule at a minimum thickness of about 100Å.

43. A method according to claim 42, wherein said second conductive metal coating covers said ferrule at a thickness ranging between about 3000 Å and about 7,000 Å.

44. A feedthrough assembly for enabling external electrical contact with an electrical device disposed within a hermetically sealed encasement, said feedthrough assembly comprising:

a ferrule extending through said encasement and having an inner surface and an outer surface;

a terminal extending through said ferrule and having a first end extending into said encasement;

a conductive metal coating covering said first end, said coating being more resistant to oxidation than said terminal;

a body of insulation material disposed between said terminal and said inner wall for preventing said ferrule from electrically contacting said terminal; and

a connector that is connected to said first end for electrically coupling and mechanically engaging said first end with said electrical device.

45. A feedthrough assembly according to claim 44, wherein said conductive metal coating also covers an area of said terminal adjacent to said body of insulation material.

46. A feedthrough assembly according to claim 44, wherein said connector is a crimping device.

47. A feedthrough assembly according to claim 44, wherein said connector is a spring device.

48. A feedthrough assembly according to claim 44, wherein said conductive metal coating entirely coats said terminal.

49. A feedthrough assembly according to claim 44, wherein said conductive metal coating is a noble metal or a noble metal alloy.

50. A feedthrough assembly according to claim 44, wherein said conductive metal coating is rhodium.

51. A feedthrough assembly according to claim 44, wherein said conductive metal coating is ruthenium.

52. A feedthrough assembly according to claim 44, wherein said conductive metal coating is palladium.

53. A feedthrough assembly according to claim 44, wherein said conductive metal coating is gold.

54. A feedthrough assembly according to claim 44, wherein said conductive metal coating is platinum.

55. A feedthrough assembly according to claim 44, wherein said conductive metal coating covers said terminal at a minimum thickness of about 100Å.

56. A feedthrough assembly according to claim 55, wherein said conductive metal coating covers said terminal at a thickness ranging between about 3000 Å and about 7,000 Å.

57. A feedthrough assembly according to claim 44, wherein said terminal is a refractory metal or a refractory metal alloy.

58. A feedthrough assembly according to claim 44, further comprising:

a second conductive metal coating covering at least a portion of said ferrule outer surface; and

a second connector for electrically coupling and mechanically engaging said ferrule outer surface with said electrical device.

59. A feedthrough assembly according to claim 44, wherein said second connector is a spring device.

60. A feedthrough assembly according to claim 44, wherein said second conductive metal coating is a noble metal or a noble metal alloy.

61. A feedthrough assembly according to claim 44, wherein said second conductive metal coating comprises titanium.

62. A feedthrough assembly according to claim 44, wherein said second conductive metal coating comprises niobium.

63. A feedthrough assembly according to claim 44, wherein said second conductive metal coating covers said ferrule at a minimum thickness of about 100Å.

64. A feedthrough assembly according to claim 63, wherein said second conductive metal coating covers said ferrule at a thickness ranging between about 3000 Å and about 7,000 Å.